Glencoe Science

Chapter Resources

Weathering and Erosion

Includes:

Reproducible Student Pages

ASSESSMENT

- ✔ Chapter Tests
- ✔ Chapter Review

HANDS-ON ACTIVITIES

- ✔ Lab Worksheets for each Student Edition Activity
- ✔ Laboratory Activities
- ✔ Foldables–Reading and Study Skills activity sheet

MEETING INDIVIDUAL NEEDS

- ✔ Directed Reading for Content Mastery
- ✔ Directed Reading for Content Mastery in Spanish
- ✔ Reinforcement
- ✔ Enrichment
- ✔ Note-taking Worksheets

TRANSPARENCY ACTIVITIES

- ✔ Section Focus Transparency Activities
- ✔ Teaching Transparency Activity
- ✔ Assessment Transparency Activity

Teacher Support and Planning

- ✔ Content Outline for Teaching
- ✔ Spanish Resources
- ✔ Teacher Guide and Answers

Mc Graw Hill Glencoe

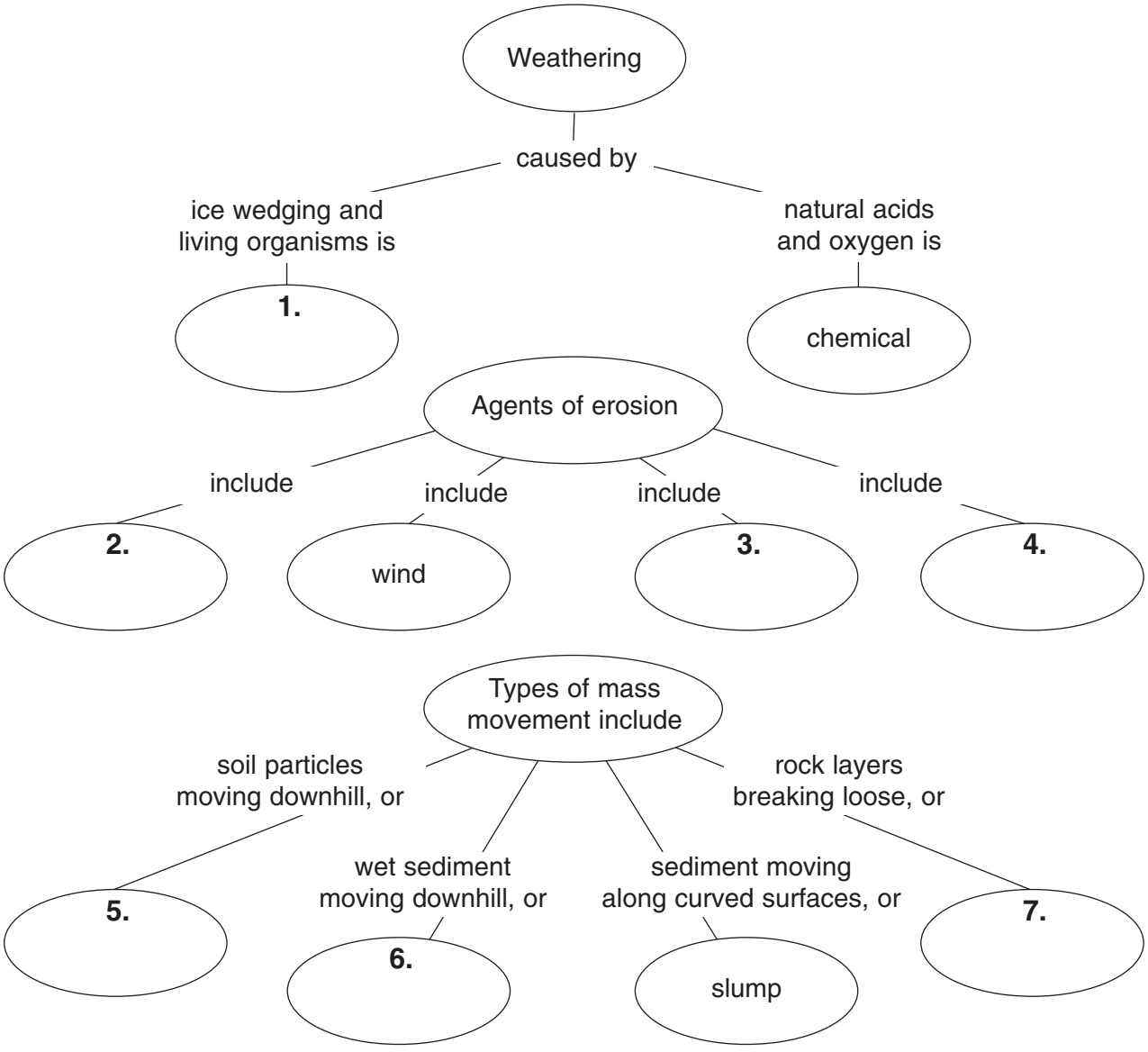
New York, New York Columbus, Ohio Chicago, Illinois Peoria, Illinois Woodland Hills, California

Directed Reading for Content Mastery

Overview
Weathering and Erosion

Directions: *Use the terms in the list below to complete the concept maps.*

gravity **water** **rock slides** **mudflows**
creep **mechanical** **ice**



Meeting Individual Needs

Name Date Class

Directed Reading for Content Mastery

Section 1 ▪ Weathering and Soil Formation

Directions: *Write the term that matches each description below on the spaces provided. Then rearrange the boxed letters to answer the final question.*

1. ___ ___ ___ ___ □ ___

2. ___ ___ ___ ___ ___ □ ___ ___ ___ ___

3. ___ ___ ___ □ ___ ___ □ ___ ___ ___

4. ___ ___ □ ___

5. ___ □ ___ ___ ___ ___

6. ___ ___ ___ □ ___ ___ ___ ___ ___ ___

7. ___ ___ ___ ___ ___ □ ___ ___

8. ___ ___ ___ □

9. ___ ___ □ ___ ___ ___ ___ ___

1. gas that is a major cause of chemical weathering

2. surface land features such as flat or hilly

3. freezing and thawing cycle that causes potholes in roads and breaks in rocks

4. mixture of weathered rock, organic matter, water, and air

5. acid produced by some plant roots

6. weathering that breaks down rocks without changing them chemically

7. acid formed from water mixing with carbon dioxide

8. caused by chemical reaction of iron and oxygen

9. weathering that changes the chemical composition of rocks

10. What is the natural process that causes rock to break down? _____

Meeting Individual Needs

Name Date Class

Directed Reading for Content Mastery

Section 2 ▪ Erosion of Earth's Surface

Directions: *For each of the following, write the letter of the term or phrase that best completes the sentence.*

_____ **1.** Erosion called mass movement is caused by _____.

a. wind **b.** gravity **c.** earthquakes **d.** runoff

_____ **2.** The major result of heavy rains or melting snow and ice is _____.

a. abrasion **b.** creep **c.** valley glaciers **d.** mudflow

_____ **3.** Sediment of different-sized particles left by ice from glaciers is called _____.

a. till **b.** outwash **c.** cirque **d.** slump

_____ **4.** Small channels called _____ are cut into Earth's surface when sheets of water flow around obstacles and become deeper.

a. gullies **b.** sand bars **c.** rills **d.** deltas

_____ **5.** _____ are the most important agent of erosion on Earth.

a. Winds **b.** Glaciers **c.** Sand dunes **d.** Streams

Directions: *Complete the paragraphs by filling in the blanks using the terms listed below.*

mudflows **rock** **gravity** **ice**
glaciers **mass movement** **erosion**
rock slides **water** **slump** **cirques**

6. _____ is the wearing away and removal of **7.** _____ material. Erosion occurs because **8.** _____, **9.** _____, wind, and **10.** _____ sculpt Earth's surface. Gravity causes different kinds of **11.** _____ such as **12.** _____, creep, and **13.** _____. Gravity also causes **14.** _____, layers of rock breaking loose and sliding down slopes.

In cold regions, snow can accumulate over many years to form huge masses of ice called **15.** _____. They can remove rock from mountain tops, leaving depressions called **16.** _____.

Meeting Individual Needs

Directed Reading for Content Mastery

Key Terms
Weathering and Erosion

Directions: *Draw a line to connect the term on the left to its description on the right.*

1. slump	mixture of weathered rock, organic matter, water, and air
2. mechanical weathering	erosion caused by wind that can lower the land's surface
3. runoff	gravity causing rock or sediment to move downhill
4. soil	thick layers of loose sediment moving downhill along a curved surface
5. mass movement	process in which composition of the rock changes
6. creep	wearing away and removal of rock material
7. topography	sediments moving slowly downhill due to freezing and thawing
8. chemical weathering	breaks rocks into pieces without changing their composition
9. erosion	erosion, caused by wind, that produces smooth, polished rocks
10. deflation	surface features of land that influence type of soil
11. abrasion	water that flows over Earth's surface

Name Date Class

SECTION 1 Reinforcement

Weathering and Soil Formation

Directions: *Answer the following questions on the lines provided.*

1. What is weathering?

_____

_____

_____

2. What is the principal difference between mechanical weathering and chemical weathering?

_____

_____

_____

Directions: *Complete the following sentences using the correct terms.*

3. Two causes of mechanical weathering are ice wedging and _____.
4. Chemical weathering takes place fastest in a _____ and _____ climate.
5. _____ takes place when the composition of the rock changes.
6. When minerals in rocks combine with _____ in the air, chemical weathering takes place.
7. _____ is a mixture of weathered rock, organic matter, water, and air.
8. The lack of thick soils on steep hills is an example of how _____ influences soil development.

Directions: *Circle the term in parentheses that correctly completes the sentence.*

9. Ice wedging occurs because a given amount of ice has a volume (greater than, less than, the same as) an equal amount of water.
10. A growing plant can cause (mechanical, chemical, both mechanical and chemical) weathering.
11. (Carbon dioxide, Oxygen, Nitrogen) in air reacts with water to dissolve rocks such as marble and limestone.
12. Deep soils develop quickly where rock weathers (slowly, rapidly, either slowly or quickly).
13. In a tropical climate, (sandy soil, clayey soil, humus) develops.
14. Many plants produce (carbonic acid, tannic acid, rust), which causes weathering in rocks.

Meeting Individual Needs

Name Date Class

SECTION 2 Reinforcement

Erosion of Earth's Surface

Directions: *Answer the following questions on the lines provided.*

1. What is the difference between weathering and erosion?

2. Name four agents of erosion.

Directions: *Identify each statement as true or false. If the statement is true, write* **T** *in the blank at the left. If the statement is false, change the underlined term to make the statement true.*

3. Mass movement is caused by ice.

4. Creep is a flow of rock or sediment along a curved surface, often down an eroded cliff.

5. Continental glaciers are located near the north and south poles.

6. The most important agent of erosion is wind.

7. If you see long striations on the surface of a rock, you would suspect mass movement.

8. Water that flows over Earth's surface is called sheet flow.

Directions: *Circle the term in parentheses that correctly completes the sentence.*

9. Creep is caused by (glacial erosion, wind, gravity).

10. Sediment left behind when a glacier melts is called (till, loess, silt).

11. (Slump, Mudflow, Creep) is a mass of wet sediment that flows downhill as a result of heavy rain, melting snow and ice, or a volcano.

12. The wearing down of rocks by blowing sand is called (deflation, grinding, abrasion).

13. Where the Mississippi River enters the Gulf of Mexico, there is a large accumulation of sediment called a (cirque, gully, delta).

14. When wind lifts and carries off small particles of weathered rock, it is called (deflation, deposition, abrasion).

Meeting Individual Needs

Name Date Class

SECTION 1 Enrichment

Rain Forest Soils

Tropical rain forests are very hot and steamy places. The average annual temperature is about 25°C. Rainfall is usually between 150 cm and 350 cm per year, with the greatest rainfalls reaching 900 cm per year or more. Many different living things flourish in these warm, moist conditions, but there is a difficult side to these conditions, too. While the plentiful rain and warm temperatures nurture a wide variety of plants and animals, they also make it particularly difficult for tropical rain forests to recover from deforestation.

The problem is that plants and animals cannot use all the water that falls as rain, and the Sun cannot evaporate the excess water. Therefore, excess water runs off the soil, taking nutrients and organic material with it. As a result, the layer of soil that contains nutrients is very thin.

Effects of Rapid Decomposition

Leaves falling from trees are one of the many factors that influence soil nutrients. In tropical rain forests, different trees shed their leaves at different times. This means there is only a thin layer of leaf litter on the ground at any time. Decomposers, such as bacteria and fungi, thrive in hot, wet conditions. The result is that leaf litter and other sources of nutrients break down quickly. Decomposers often can break down dead animals and plants within 24 hours.

Other plants take up the nutrients almost as soon as they are released. Rain forest trees have shallow root systems that allow them to absorb nutrients from the forest floor. They do this so rapidly that nutrients don't have time to be stored in the soil. Therefore, unlike soil in temperate forests, the humus layer of rain forest soil is very thin.

Effects of Deforestation

As long as trees and plants growing in forest soil can quickly absorb the nutrients, many living things can thrive in these conditions. When rain forests are cleared for farming or cattle grazing, however, the soil can support crops or grasses for only a few years. By then, most of the remaining nutrients have been removed. The land is then abandoned. The soil is bare and exposed to the effects of rain, heat, and wind. Erosion quickly washes away the topsoil and any remaining nutrients, leaving behind a subsurface layer called laterite. This soil is colored red by aluminum and iron oxides. Exposed to the hot Sun, this layer can become as hard as concrete. It is nearly impossible for rain forests to regrow under these conditions.

Meanwhile loggers, farmers, and cattle ranchers move to new areas of rain forest and destruction begins again. In some areas, about 2,000 trees per minute are cut down in the rain forests. Scientists estimate that an area of tropical rain forest about the size of the state of Wisconsin is being destroyed every year.

1. Why would it be difficult to replant trees in an area of tropical rainforest that has been cleared? What do you think would have to be done before this could be attempted?

2. How would the soil in a tropical rainforest be different from the soil in a tropical forest that has a wet season and a dry season?

Meeting Individual Needs

SECTION 2 Enrichment

Canada's Landscape

About a million years ago, the climate over what is now Canada began to cool, and snow accumulated to form great ice sheets across the land. As the ice became heavier, it began to move, scouring the landscape and picking up a collection of clay, sand, and gravel that acted like a giant sheet of sandpaper on the land. The glaciers moved rocks, gouged out valleys, rounded off hilltops, and shaved the sides off mountains.

Then, as the climate warmed, the glaciers melted and slowly retreated, but their imprint on the landscape can be seen even today.

Evidence Left Behind

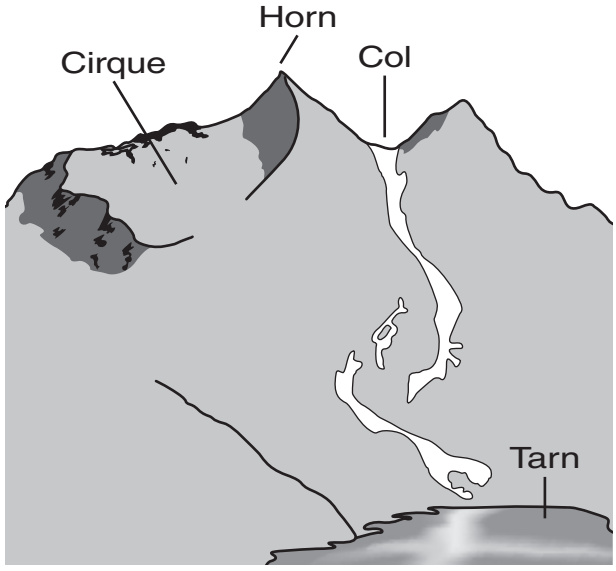
For example, Canada's mountains still show the effects with cirques, or basins, eroded out of mountaintops. There are also arêtes, jagged knifelike ridges formed where cirques on opposite sides of a mountain meet. Other features include rugged peaks called horns, where the mountain was eroded on several sides, and cols, or gaps between two mountain horns.

When the glaciers melted, the rushing water filled the depressions in the land as well. Tarns, lakes at the bottom of cirques, filled with water, while other depressions also became lakes. In fact, the present-day Great Lakes are the remains of larger lakes that filled with the enormous amount of water from the glaciers.

Glacial Features

In addition, the makeup of the land itself still shows the effects of the glaciers. Huge boulders were carried great distances and left behind when the ice retreated. Till, a mixture of clay and rock, was deposited in gently rolling plains when the glacier had picked up more debris than it could carry. Moraines, long ridges of material deposited by the melting glaciers, were formed, along with eskers, long ridges of sediment deposited in glacial streams.

All of these features can be seen when traveling through Canada's rugged terrain. While the ancient glaciers have been gone for thousands of years, the evidence of their passing still can be found.



1. Why is Canada an ideal location to study the effects of glacial movement?

2. What is a cirque, and what other features does it help form?

Name Date Class

Note-taking Worksheet

Weathering and Erosion

Section 1 Weathering and Soil Formation

A. Natural process that causes rocks to break down is called _____.

B. _____ _____—breaks rocks into smaller pieces without changing them chemically

1. _____ _____ is the freezing and thawing cycle that breaks rocks apart.
2. Plant _____ and burrowing _____ exert pressure on rocks.

C. When the chemical composition of rock changes, _____ _____ has occurred.

1. _____ _____, from water and carbon dioxide, reacts chemically with many rocks.
2. _____ _____, formed from a plant's release of tannin, dissolves some rock minerals.
3. Oxygen can cause rocks containing iron to rust in the process of _____.

D. _____—mixture of weathered rock, organic matter, water, and air that supports the growth of plant life

1. The _____ _____ affects what kind of soil develops.
2. _____ influences soil development.
3. The _____ in tropical regions increases the rate of weathering forming soil more quickly than in deserts.
4. Rocks take _____, perhaps thousands of years, to weather into soil.
5. _____ _____ affect soil development.

Meeting Individual Needs

Note-taking Worksheet (continued)

Section 2 Erosion of Earth's Surface

A. _____—wearing away and removal of rock; occurs because of gravity, ice, wind, and water

B. _____ _____—gravity pulls rock or sediment down slopes.

1. _____—sediments move downhill slowly.

2. _____—rock or sediment moves downhill along a curved slope.

3. Rock layers break loose and slide downhill in a _____ _____.

4. _____—mass of wet sediment that flows downhill over the ground surface

C. _____ forms continental and valley glaciers.

1. _____ _____ can occur as glaciers remove loose pieces of rock or as dragged rock scratches rock underneath the glacier.

2. Glaciers can form _____ and steep peaks in mountains, create lakes, or totally remove rock from the surface.

3. Glaciers deposit _____.

a. _____, a mixture of different sized particles ranging from clay to boulders, is deposited directly from the bottom of a glacier.

b. _____ includes sand and gravel deposits moved by rivers from melting glaciers.

D. Wind—blows small particles from Earth's surface in a process called _____

1. _____ forms pits in rocks or polishes surfaces smooth as sediments are blown by strong winds.

2. _____ can form as the wind is slowed as it blows around irregular features such as rock or vegetation and deposits the sediment it carried.

3. _____, or fine silt, often collects downwind of large deserts or near glacial streams.

Note-taking Worksheet (continued)

E. _____—water flowing on Earth's surface causes erosion.

1. _____ _____—when water flows downhill as a thin sheet often carrying loose sediment grains
2. _____ and gullies are channels cut into Earth's surface and are formed as runoff carries sediments along.
3. Streams have water flowing through them _____; they eventually flow into the ocean or a large lake.
4. _____ water in streams is the most important agent of erosion; streams shape more of Earth's surface than ice, wind, or gravity.